# SCIS 1P50
# Library Seminar
# Fall 2024 term

*Ian Gordon*

Ian Gordon, Teaching & Learning Librarian

Brock University Library

# SCIS 1P50 - Science and Society I

Basic questions and problems in understanding the nature of science in relation to current environmental issues and their impact on society. Most common scientific concepts and theories associated with major environmental problems facing the world today.

# SCIS 1P50 Science & Society I

Article Choice – 5%

Choose an original research/study article from a recent peer-reviewed science journal (published not earlier than September 2023) from the topics covered in SCIS 1P50. The article you choose for analysis should not be a news summary, a commentary, a letter to the editor, nor a review. (No social science/psychology papers). Additionally, you should not use any of the readings used in this course.

A copy of your chosen article and a full reference/citation for it (following the APA format) is due on the course Brightspace site on Monday September 30th by 11:00 PM. This portion of the term paper is worth 5% of the course grade. Failure to submit the article will result in a grade of zero for the assignment. This is to ensure success in the term paper by the correct choice of a suitable article. A correct choice will be indicated by your grade on Brightspace, otherwise the seminar leader will email you if it was incorrect and you will have to submit a correct article.

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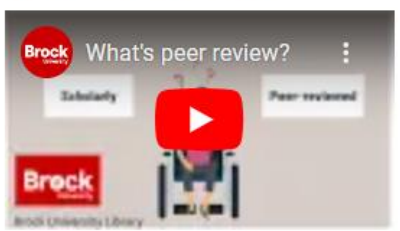
## What's an Annotated Bibliography?


## What are Primary & Secondary Sources


## What's a Search Strategy?


## What are "Scholarly" Sources?


## What does "Peer Review" Mean?

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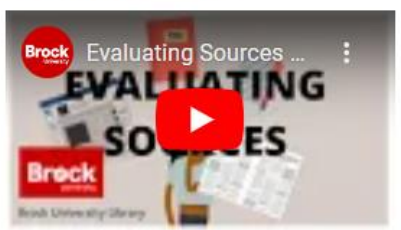


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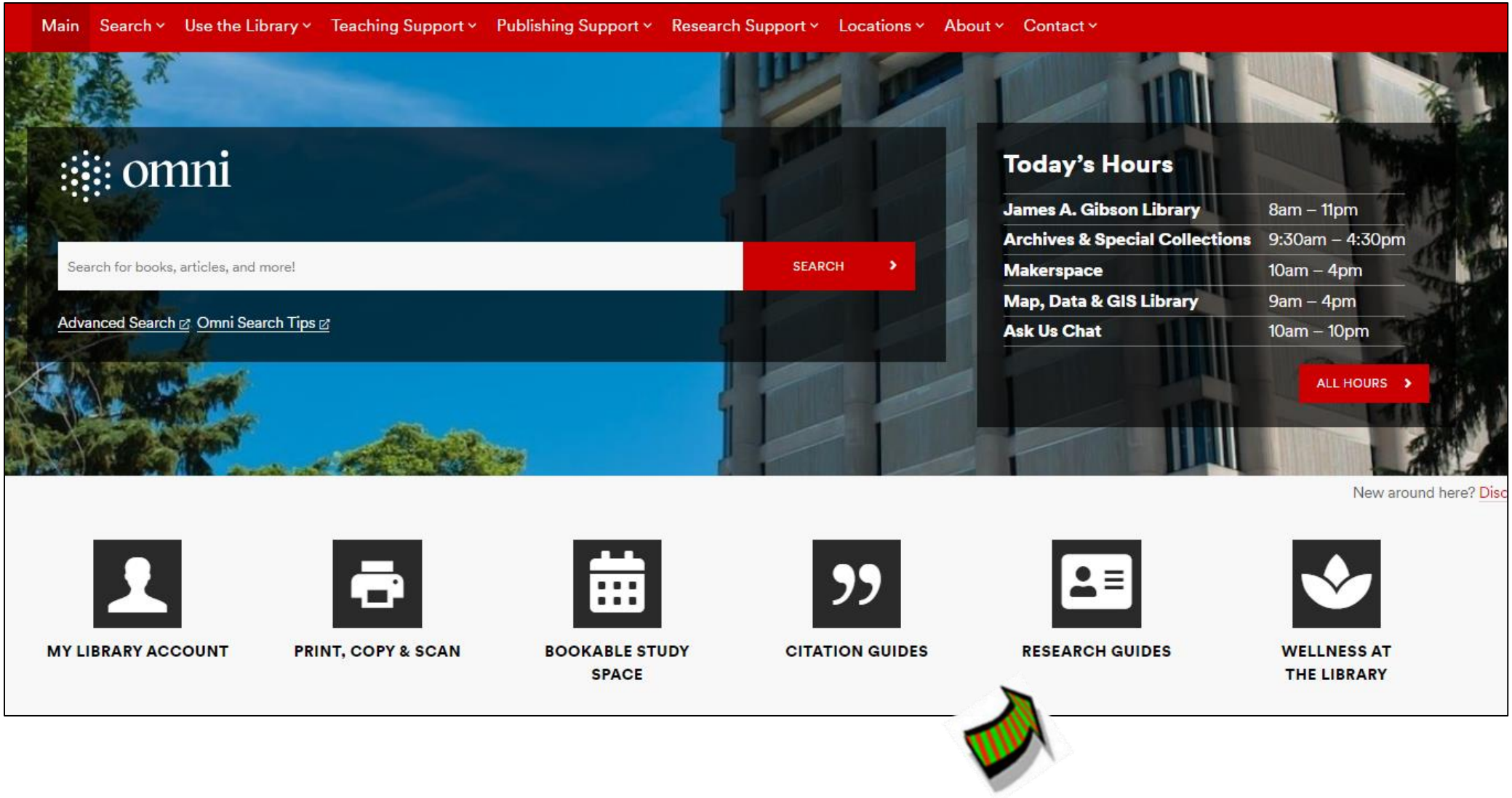

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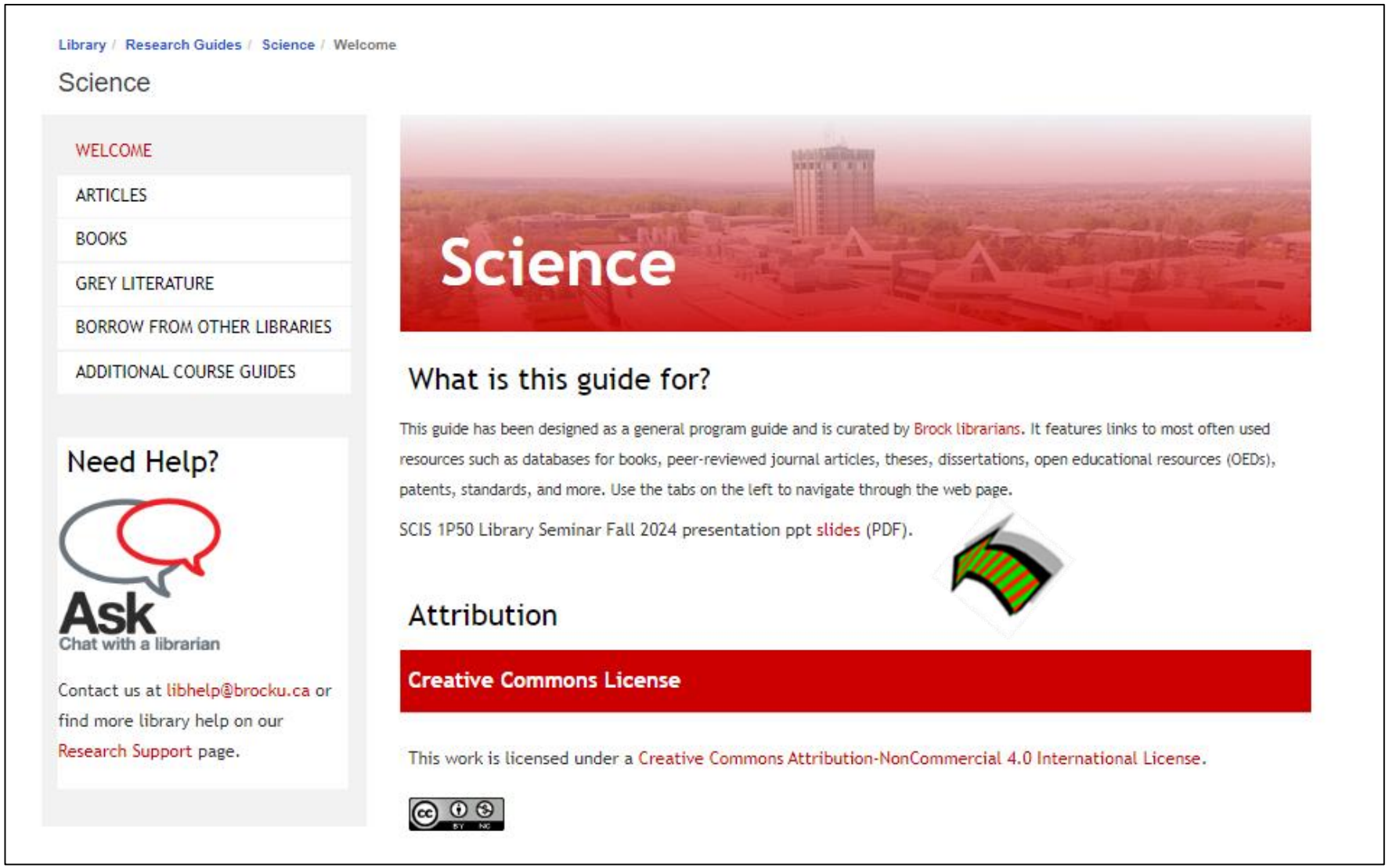

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Habitat degradation, climate change, and environmental pollution are adversely affecting Canadian wildlife including polar bears.

Habitat degradation, climate change, and environmental pollution are adversely affecting Canadian wildlife including polar bears.

What are the harmful pollutants, originally emitted at latitudes much lower than those inhabited by the polar bears, that may also be affecting their long-term survival?

What are the harmful pollutants, originally emitted at latitudes much lower than those inhabited by the polar bears, that may also be affecting their long-term survival?

Concept one: Polar bears or Ursus maritimus

Concept two: blood* or contamin* or metal* or habitat or pollut* or lead* or ecotox* or exposure

Concept three: environment* or scien* or sustain* or surviv* or climate

Concept four: September 2023+, English, scholarly, peer reviewed, 6-10 pages ideal, scientific, understandable, interesting…

Related to Course objectives
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# Articles

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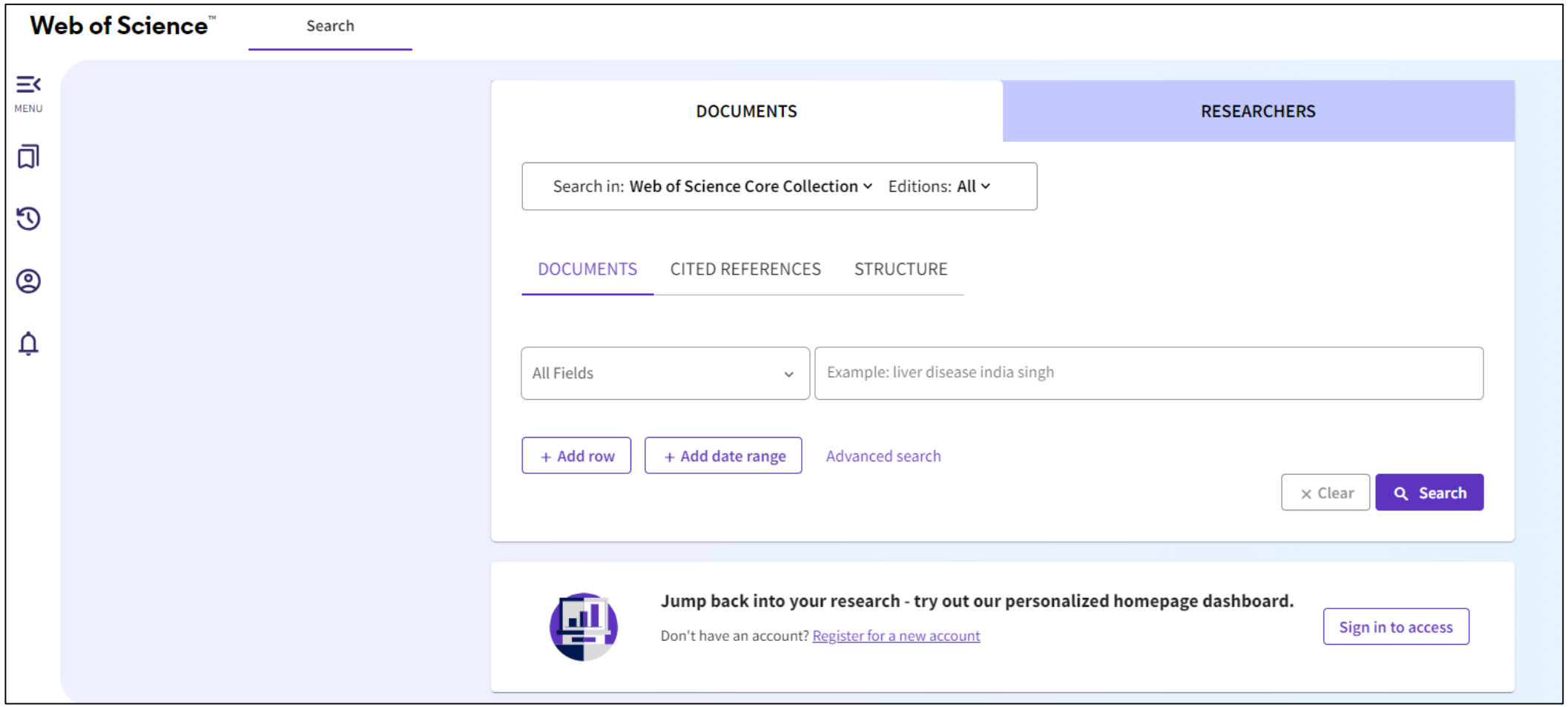
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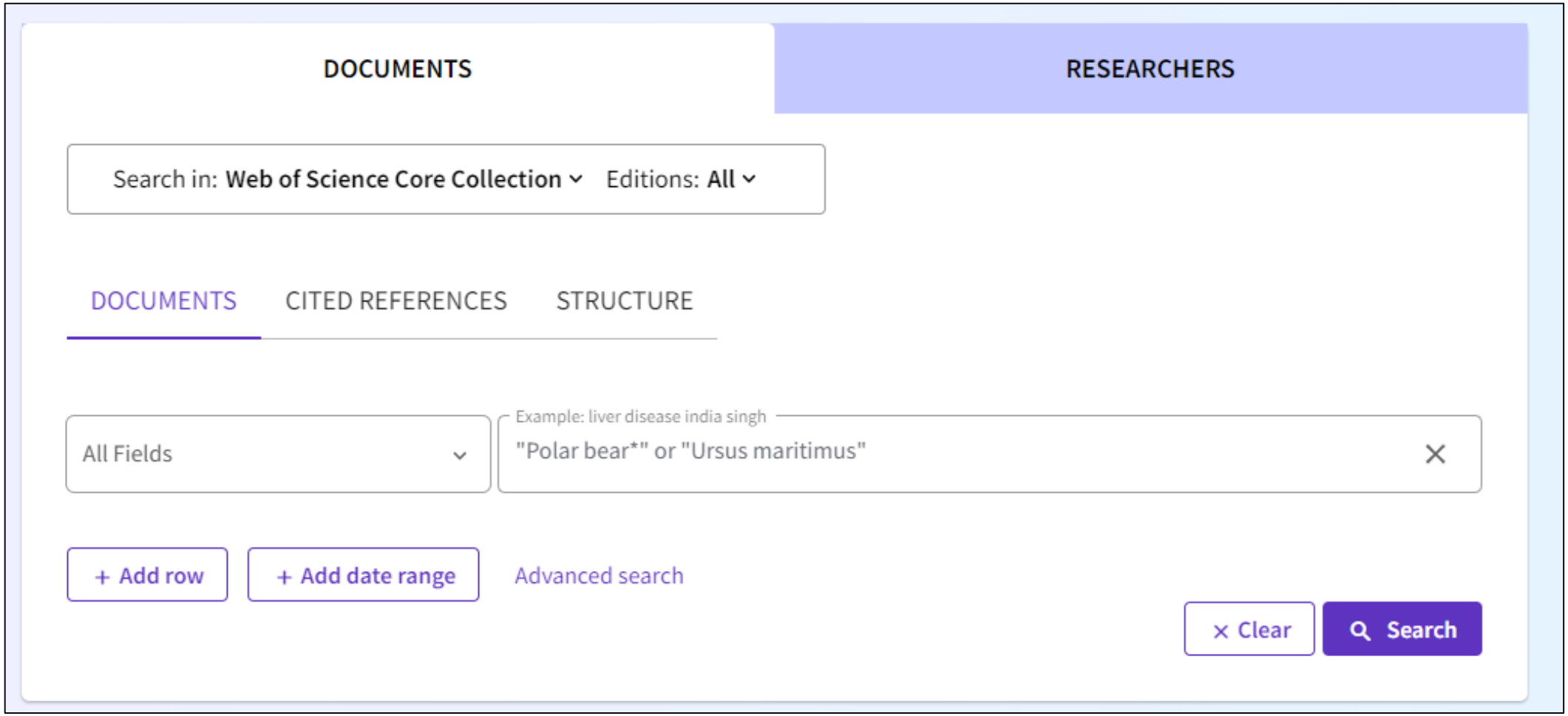
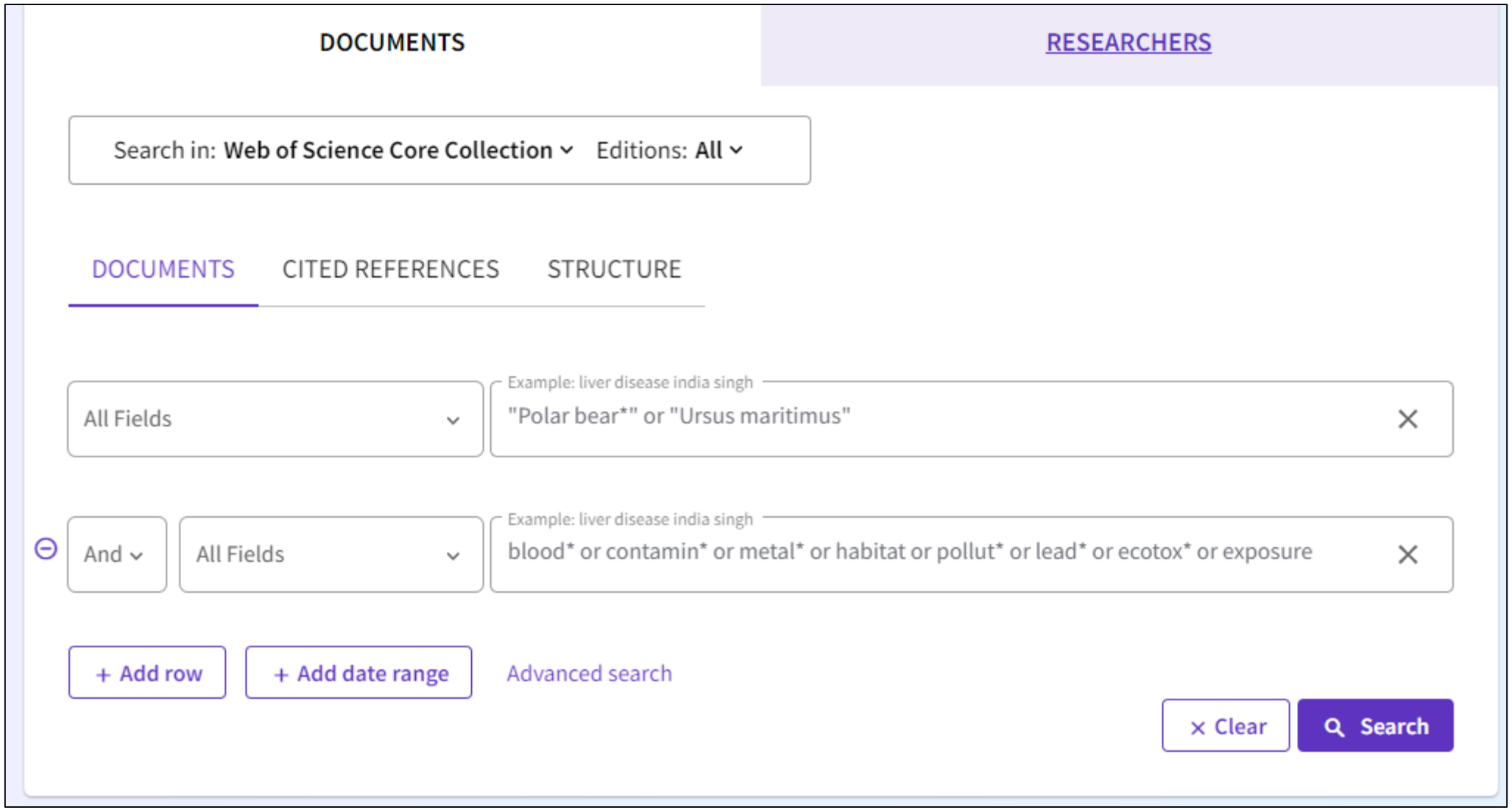
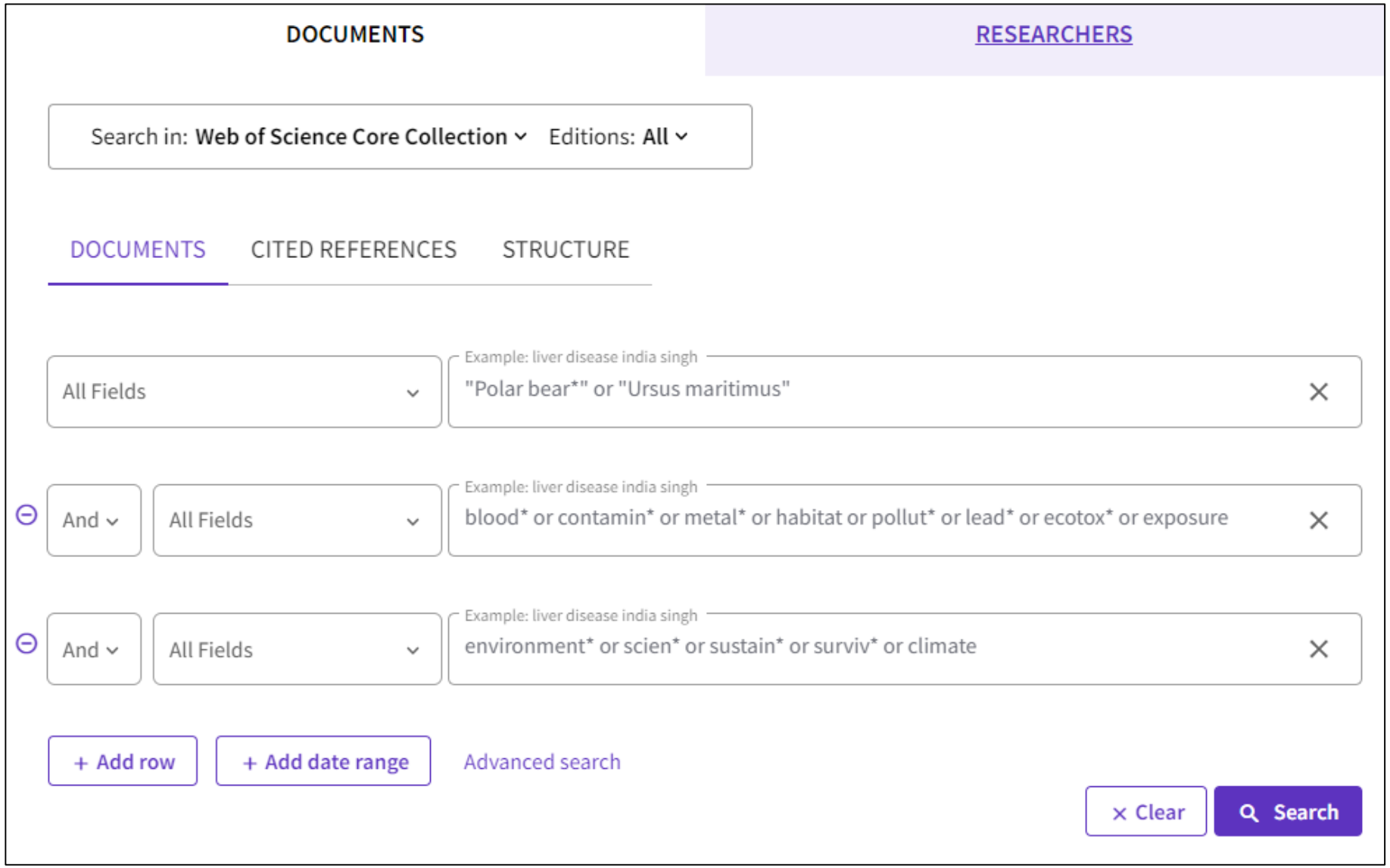


1453 citations



1227 citations



68 citations

Refined By: Publication Years: 2023 or 2024 ✕ Document Types: Article ✕ Languages: English ✕

1 **Sea ice influence on male polar bear survival in Hudson Bay**

Mcgeachy, D; Lunn, NJ; (...); Derocher, AE

Sep 2024 | ARCTIC SCIENCE 10 (3) , pp.483-498

Environmental variability and seasonality of resources influence species distribution and demographic parameters such as survival. We quantified the spatiotemporal dynamics of sea ice that remains in Hudson Bay during break-up (remnant ice) and assessed relationships with apparent survival for three age classes of male polar bears (Ursus maritim ... Show more

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101 References

Related records

2 **Land-based foraging by polar bears reveals sexual conflict outside mating season**

Prop, J; Black, JM; (...); Moe, B

Aug 31 2024 | SCIENTIFIC REPORTS 14 (1)

Enriched Cited References

According to sexual selection theory, the sexes are faced with opposing evolutionary goals. Male fitness benefits from access to females, whereas female fitness is constrained by food resources and safety for themselves and their offspring. Particularly in large solitary carnivores, such as polar bears (Ursus maritimus), these divergent goals can potentially l ... Show more

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113 References

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3 **Pesticides in the population of European hedgehogs (*Erinaceus europaeus*) in Denmark**

Rasmussen, SL; Roslev, P; (...); Vorkamp, K

Aug 9 2024 | FRONTIERS IN VETERINARY SCIENCE 11

Enriched Cited References

European hedgehogs (Erinaceus europaeus) inhabit most of Denmark, except for a few smaller islands. Research from other European countries has shown that the hedgehog populations are in decline. The exposure to chemicals might contribute to this development, although their role is currently unknown. Our research studied the occurrence of 19 sele ... Show more

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19 **An assessment of microplastics in fecal samples from polar bears (Ursus maritimus) in Canada's North**

Iyare, PU; Vanderlip, HL; (...); Orihel, DM

Jun 2024 | ARCTIC SCIENCE 10 (2) , pp.409-423

We assessed the potential for plastic ingestion in polar bears (Ursus maritimus (Phipps (1774))) using fecal analysis. Two method studies ensured our protocols could effectively recover and identify plastics in feces. First, microplastics (film, foam, or fragments) were intentionally introduced into a model organic matrix. Recovery rates (mean +/- standard deviatio ... Show more

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# An assessment of microplastics in fecal samples from polar bears (Ursus maritimus) in Canada's North

Associated Data

By
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Iyare, PU (Iyare, P. U.) ; Vanderlip, HL (Vanderlip, H. L.) [2] ; Dias, M (Dias, M.) [1] ; Provencher, JF (Provencher, J. F.) [3] ; Zou, S (Zou, S.) [4] ; Lougheed, SC (Lougheed, S. C.) [2] ; Whitelaw, G (Whitelaw, G.) [1] ; Branigan, M (Branigan, M.) [5] ; Dyck, M (Dyck, M.) [6] ; Orihel, DM (Orihel, D. M.) [1] , [2]

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Abstract

We assessed the potential for plastic ingestion in polar bears (Ursus maritimus (Phipps (1774))) using fecal analysis. Two method studies ensured our protocols could effectively recover and identify plastics in feces. First, microplastics (film, foam, or fragments) were intentionally introduced into a model organic matrix. Recovery rates (mean +/- standard deviation) averaged 95.8 +/- 14.7% (n = 18) and were significantly affected by microplastic morphology but not digestion status. Second, microplastic fragments of polypropylene, polyethylene terephthalate, and polystyrene were intentionally introduced to polar bear feces. Recovery rates averaged 79.3 +/- 21.6% (n = 8) and Raman microscopy successfully identified all three polymers in 87.5% of samples. The main study then investigated the presence of microplastics in hunter-collected polar bear feces in the Canadian Arctic. Feces from the colons of hunted bears (n = 15) and field scat (n = 15) were collected through collaboration with Inuit communities. Polypropylene, polyethylene, and/or polyethylene terephthalate were detected in the feces of eight bears. Concentrations of microplastics in feces were, on average, less than 1 particle/g dry weight feces and at or near detection limits. Overall, this work suggests microplastic ingestion by Canadian polar bears may be low and demonstrates the utility of fecal sampling for community-based monitoring programs.

Keywords

**Author Keywords:** plastic pollution; mammals; plastic ingestion; Arctic

**Keywords Plus:** ANTHROPOGENIC PARTICLES; MARINE MAMMALS; HUDSON-BAY; IDENTIFICATION; SCIENCE; SUMMER; LITTER

Iyare, P. U., Vanderlip, H. L., Dias, M., Provencher, J. F., Zou, S., Lougheed, S. C., Van Coeverden De Groot, P. J., Whitelaw, G., Branigan, M., Dyck, M., & Orihel, D. M. (2024). An assessment of microplastics in fecal samples from polar bears (ursus maritimus) in Canada's North. *Arctic Science, 10(2)*, 409–423. https://doi.org/10.1139/as-2023-0060

Arctic Science

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# An assessment of microplastics in fecal samples from polar bears (*Ursus maritimus*) in Canada's North

P.U. Iyare[a], H.L. Vanderlip[b], M. Dias[a], J.F. Provencher[c], S. Zou[c], S.C. Lougheed[b], P.J. Van Coeverden de Groot[b], G. Whitelaw[a], M. Branigan[a], M. Dyck[f], and D.M. Orihel[a,b]

[a]School of Environmental Studies, Queen's University; Kingston, ON K7L 3N6, Canada; [b]Department of Biology, Queen's University; Kingston, ON K7L 3N6, Canada; [c]Environment and Climate Change Canada, 200 Boulevard Sacré-Coeur, Gatineau, QC J8X 4C6, Canada; [d]Metrology Research Centre, National Research Council of Canada, 100 Sussex Drive, Ottawa, ON K1A 0R6, Canada; [e]Department of Environment and Climate Change, Government of the Northwest Territories, Inuvik, NWT, Canada; [f]Environment, Government of Nunavut, Igloolik, NU, Canada

Corresponding author: **D.M. Orihel** (email: diane.orihel@queensu.ca)

## Abstract

We assessed the potential for plastic ingestion in polar bears (*Ursus maritimus* (Phipps (1774))) using fecal method studies ensured our protocols could effectively recover and identify plastics in feces. First, microplastics fragments) were intentionally introduced into a model organic matrix. Recovery rates (mean ± standard devia 95.8 ± 14.7% ($n = 18$) and were significantly affected by microplastic morphology but not digestion status. Second fragments of polypropylene, polyethylene terephthalate, and polystyrene were intentionally introduced to po Recovery rates averaged 79.3 ± 21.6% ($n = 8$) and Raman microscopy successfully identified all three polyme samples. The main study then investigated the presence of microplastics in hunter-collected polar bear feces in Arctic. Feces from the colons of hunted bears ($n = 15$) and field scat ($n = 15$) were collected through collaboration with Inuit communities. Polypropylene, polyethylene, and/or polyethylene terephthalate were detected in the feces of eight bears. Concentrations of microplastics in feces were, on average, less than 1 particle/g dry weight feces and at or near detection limits. Overall, this work suggests microplastic ingestion by Canadian polar bears may be low and demonstrates the utility of fecal sampling for community-based monitoring programs.

**Key words:** plastic pollution, mammals, plastic ingestion, Arctic

## 1. Introduction

Plastic litter is found in Arctic ecosystems, including in areas with little or no human activity (Lusher et al. 2015; Collard and Ask 2021; Pinzone et al. 2021). At the regional scale, local sources can contribute significantly to plastic pollution, although these sources are considered of less importance in the Arctic (Brown et al. 2014; Skaar et al. 2019). Examples of these sources include sewage outlets, open waste disposal, tourism, fishing, and shipping (Halsband and Herzke 2019; Eriksen et al. 2020). There is a body of literature that suggests that plastics can be transported by air (mostly microplastics: Dris et al. 2016; Bergmann et al. 2019; Evangeliou et al. 2020) and ocean currents (Cozar et al. 2017; Wichmann et al. 2019). In the near future, the Arctic may accumulate plastics at a greater rate than other parts of the globe due to the decline in sea ice volume, increased maritime activity and tourism, melting glaciers, reduced plastic degradation rates in the Arctic, and unique hydrodynamic patterns (Collard and Ask 2021). This accumulation of plastic raises questions as to whether this pollution poses risks to the health of Arctic wildlife.

The Arctic Monitoring and Assessment Program (AMAP), a working group of the Arctic Council that is tasked with assessing Arctic pollution and climate change, has identified plastic pollution as an emerging threat to Arctic ecosystems (AMAP 2021). In 2019, AMAP established the Litter and Microplastics Expert Group (LMEG) to advise on monitoring litter and microplastics at the pan-Arctic scale and carry out assessments on plastic pollution that meet the needs of Arctic nations, as well as contribute to international efforts. Within the LMEG's efforts to support pan-Arctic monitoring of litter and microplastics, they have indicated that studies focused on plastic ingestion by mammals are important for addressing questions related to regional food security and animal health (Lusher et al. 2022). Thus, there is a need to explore how plastic ingestion studies can be carried out on species that are harvested for consumption by northern communities.

Plastic ingestion has only been investigated in a few Arctic mammals (Bourdages et al. 2020; Moore et al. 2020; Carlsson et al. 2021; Pinzone et al. 2021; Jardine et al. 2023*b*). Moore et al. (2020) assessed microplastics in the gastrointestinal tracts



## 2. Materials and methods

This research consisted of two method dev
ies, followed by the main study. The first me
carried out to (a) adapt methods for identif
tics in polar bear feces, (b) design a standard
tion and digestion protocol, and (c) examine

### 3.3. Main study: testing for the presence of environmental microplastics in polar bear feces

In our survey of colon feces and scat, we found some evi-
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## 4. Discussion

### 4.1. Fecal analysis as a means of evaluating the exposure of polar bears to plastics

Our methods successfully identified microplastic particles
that were intentionally introduced to model organic matrix
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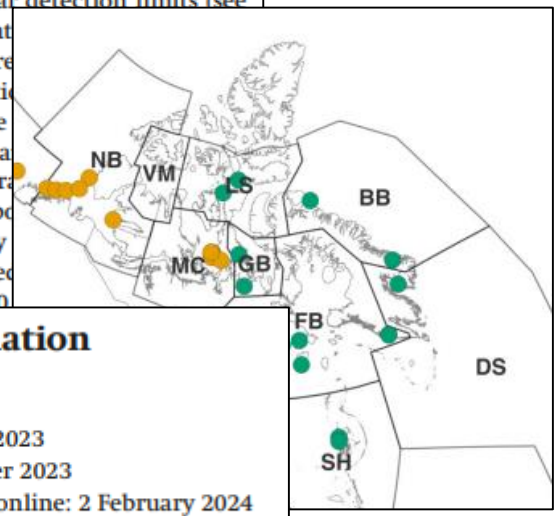


## References

AMAP. 2021. AMAP litter and microplastics monitoring guidelines. Version 1.0. Arctic Monitoring and Assessment Programme (AMAP), Tromsø, Norway. p. 257.

Araujo, C.F., Nolasco, M.M., Ribeiro, A.M.P., and Ribeiro-Claro, P.J.A. 20 Identification of microplastics using Raman spectroscopy: latest velopments and future prospects. Water Research, **142**: 426–4 doi:10.1016/j.watres.2018.05.060.

Auguie, B. 2017. gridExtra: miscellaneous functions for "Grid" graph R package version 2.3. Available from https://cran.r-project.org/ kage=gridExtra.

Barnes, D.K. 2005. Remote islands reveal rapid rise of southern he sphere sea debris. The Scientific World Journal, **5**: 915–921. doi: 1100/tsw.2005.120.

Bates, D., Mächler, M., Bolker, B., and Walker, S. 2015. Fitting linear mixed-effects models using lme4. Journal of Statistical Software, **67**(1): 1–48. doi:10.18637/jss.v067.i01.

## Article information

### History dates

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Version of record online: 15 May 2024

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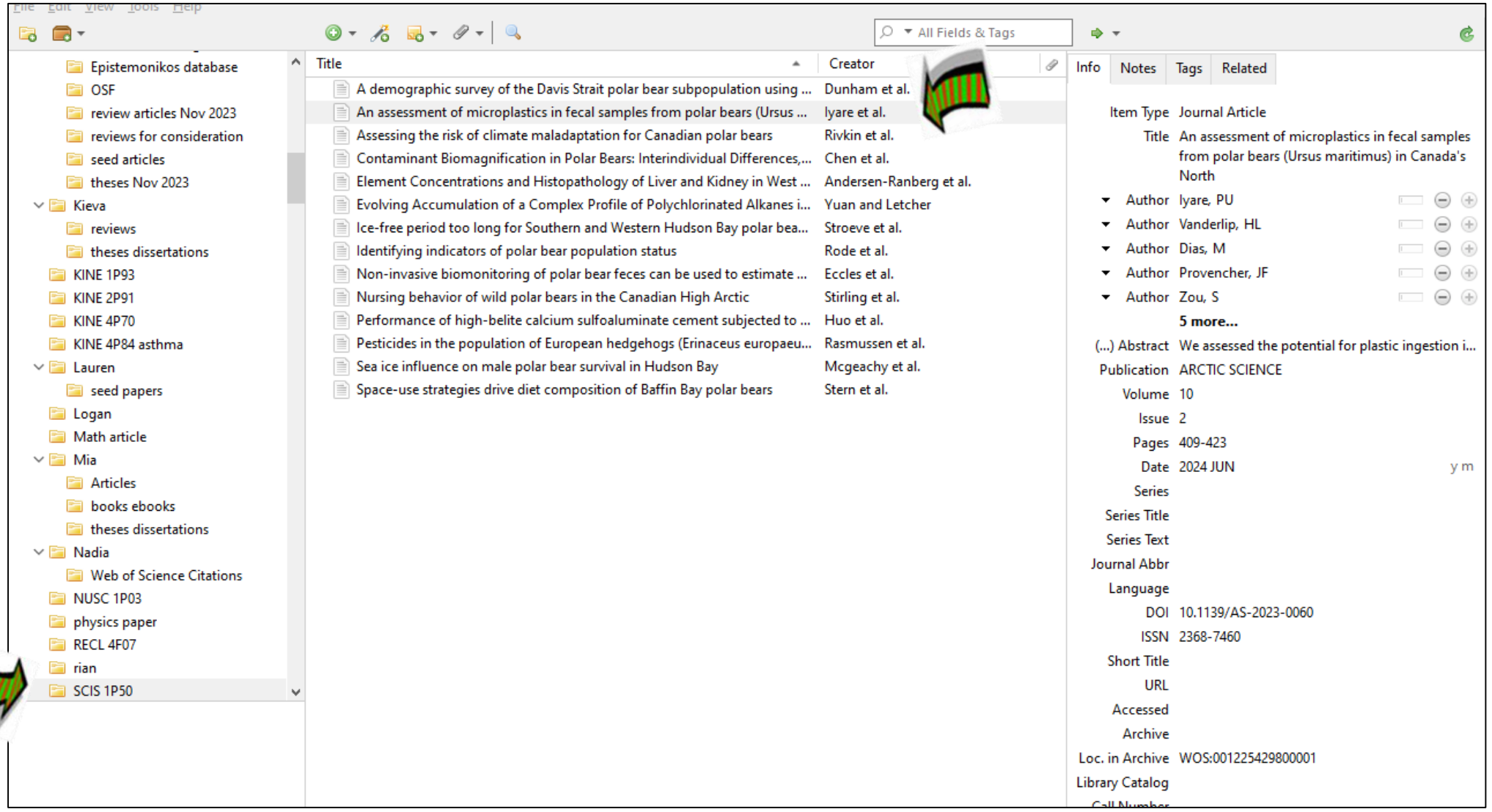

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